(12) UK Patent Application (19) GB (11) 2 301 000 (13) A

(43) Date of A Publication 20.11.1996

(21) Application No 9610577.0

(22) Date of Filing 20.05.1996

(30) Priority Data
(31) 9510072 (32) 18.05.1995 (33) GB

(71) Applicant(s)
Evets Communications Limited

(Incorporated in the United Kingdom)

Enfield House, 303 Burton Road, DERBY, DE23 6AG, United Kingdom

(72) Inventor(s)
Stephen Haseldine
Martyn Coldicott

(74) Agent and/or Address for Service
Swindell & Pearson
48 Friar Gate, DERBY, DE1 1GY, United Kingdom

(51) INT CL^6
G08B 3/10 , H04M 11/00 // H04M 11/02 11/04

(52) UK CL (Edition O)
H4L LDA

(56) Documents Cited
GB 2198269 A GB 2135156 A WO 90/03041 A1

(58) Field of Search
UK CL (Edition O) G4H HNEL HNMB , H4L LDA LDLX
LERA LETD
INT CL^6 G08B 3/10 , H04M 11/00 11/02 11/04 11/08 , H04Q 7/06 7/08 7/16
On-Line: WPI

(54) Communication system with total or individual paging facility

(57) A communication system has a plurality of transmitters 12A, 12B and receivers 14A, 14B. Each transmitter can send messages to the receivers. At least one of the transmitters can send first type messages for receivers not individually identified in the message, or second type messages which include identification of a recipient receiver. An alarm message associated with a warning such as fire, bomb, doorbell etc, can therefore be sent to all receivers using the first message type, whereas a paging signal containing information relating to a specific person can be sent using the second message type.

All messages consist of a header, including an alarm bit, and message data. In first type messages the alarm bit is set and the message data may carry information relating to the type of alarm. Second type messages do not set the alarm bit, but carry the identity of the specific receiver in the header and the paging information in the message data.

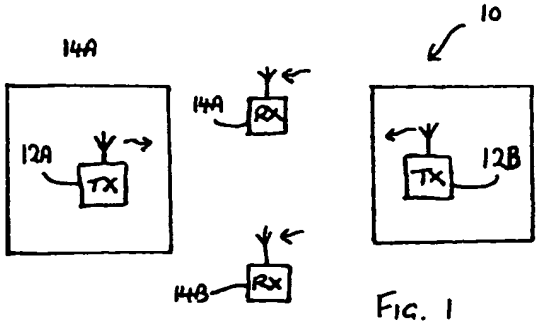

Fig. 1

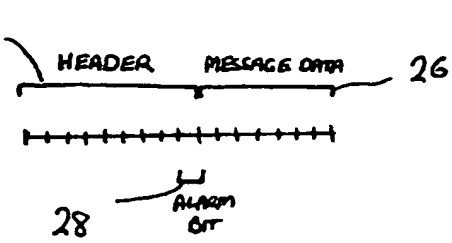

Fig. 3

GB 2 301 000 A

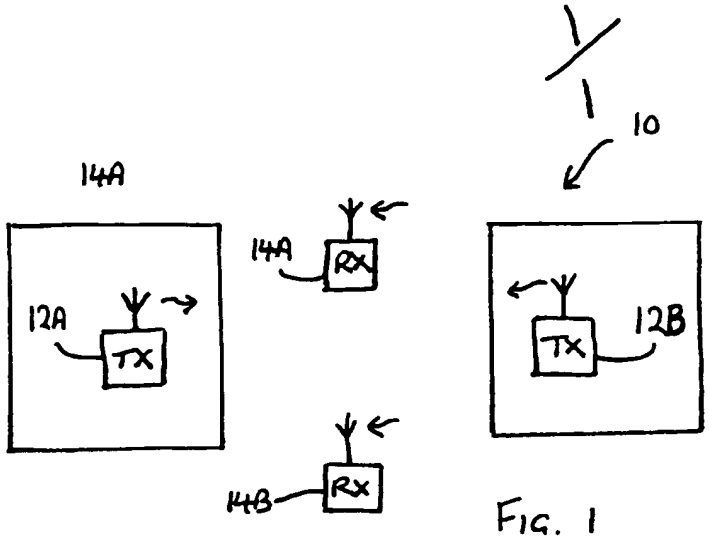

FIG. 1

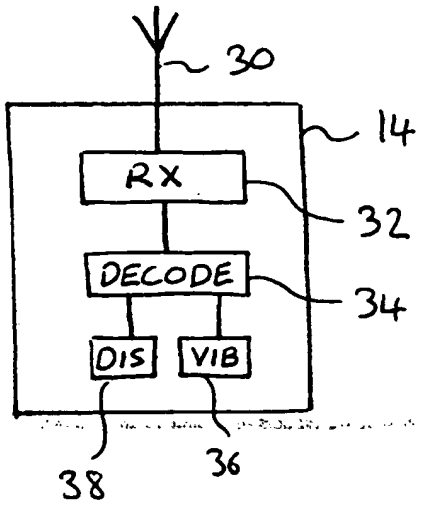

FIG. 4

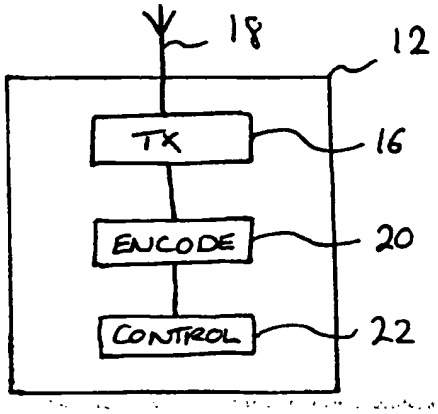

FIG. 2

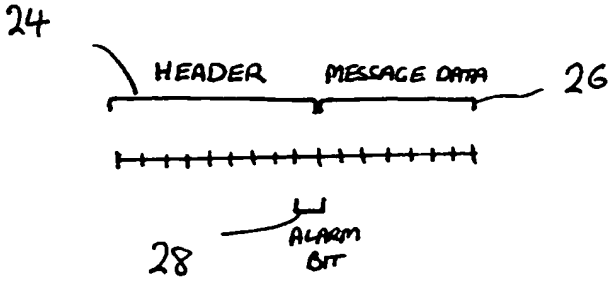

FIG. 3

2301000

Communication System

The present invention relates to communication systems and particularly, but not exclusively, to systems for facilitating communication with people having impaired hearing.

Among the difficulties presented by impaired hearing, is the problem that sufferers cannot hear alarms sounding, such as fire alarms. In consequence, they may be placed at physical risk even though otherwise able-bodied, merely because they are not alerted sufficiently quickly, or at all. They may not realise that an evacuation is under way, for instance as a result of a fire. The present invention seeks to address these difficulties.

The invention provides a communication system comprising at least one transmitter means and at least one receiver means, the or each transmitter means being operable to transmit messages for receipt by receiver means, and the or each receiver means being operable to receive messages transmitted by transmitter means, wherein the or at least one of the transmitter means is operable to transmit a message of a first type for receiver means which are not individually identified in the message, or of a second type which includes identification of the intended recipient receiver means.

Consequently, if a deaf person carries a receiver which responds to first type messages, they can be alerted whenever they are within range of a transmitter means which can send first type messages, but it is not necessary for those initiating the transmission of the message to know the identity, location or even the presence of the person carrying that receiver. The general purpose message of the first type therefore performs in a manner similar to a general purpose announcement over a public address system. Second type messages, however, identify the intended recipient and can therefore be used for private messages.

Preferably at least one receiver means is operable to detect identification information contained in a message and to respond to all messages received which are of the first type and to any received message which is of the second type and which identifies that receiver means as the intended recipient. There may be at least one receiver means which is operable to detect identification information contained in a message and to respond only to all messages received which are of the first type. There may be at least one receiver which is operable to detect identification information contained in a message and to respond only to a received message which is of the second type and which identifies the receiver means as the

intended recipient.

Preferably substantially all receiver means are operable to receive messages transmitted by substantially all of the transmitter means. The messages are preferably transmitted as radio signals and preferably substantially all of the transmitter means transmit at least first type messages on the same frequency. Second type messages may be transmitted on respective frequencies by the transmitter means. Second type messages may be transmitted after encoding in a manner unique to the transmitter means in use. Receiver means may be operable to decode second type messages only if sent from designated transmitter means with which they are associated.

Preferably substantially all transmitters are operable to transmit messages of the first type, whereby receiver means may be sent a message of the first type when within range of substantially any transmitter. Preferably substantially all of the transmitters are operable to transmit messages of the first and of the second type.

Messages may be digitally encoded and preferably include label data which identifies the intended

recipient receiver means or identifies the message as a message of the first type. A message of the first type may include identification of the message as a message of the first type. A message of the first type may be identified by the state of an identifying bit. At least messages of the second type may include message data.

Preferably at least one receiver means is operable in receipt of a first message to alert a user in a substantially non-audible manner. The said one receiver means may be operable to vibrate to alert a user.

The invention also provides transmitter means for use in the system defined above, and operable to send first type and second type signals. The invention also provides receiver means for use in the system defined above and operable to receive first type or second type signals.

Examples of a system according to the present invention will now be described in more detail, by way of example only and with reference to the accompanying drawings in which:

Fig. 1 is a highly schematic diagram of a communication system according to the present invention;

Fig. 2 is a schematic diagram of the internal workings of a transmitter for use in the system of Fig. 1;

Fig. 3 is a schematic of a digital message for use in the system of Fig. 1; and

Fig. 4 is a schematic diagram of the internal workings of a receiver for use in the system of Fig. 1.

The communication system 10 shown in the drawings, particularly in Fig. 1, comprises a plurality of transmitter means 12A,12B and a plurality of receiver means 14A,14B. Each transmitter means 12 is operable to transmit messages for receipt by receiver means 14. Each receiver means is operable to receive messages transmitted by transmitter means 12. At least one of the transmitters 12 is operable to transmit a message of a first type for receiver means which are not individually identified in the message, or of a second type which includes identification of the intended recipient receiver means. At least one receiver means 14 is operable to respond to received messages, as will be described.

Before describing the operation of the system in

more detail, it is appropriate to describe the construction of transmitters and receivers in more detail, and to describe the nature of a message signal used in the system.

Fig. 2 shows a radio transmitter 12 having transmitter circuits 16 driving an aerial 18 in a manner which may be conventional in itself. The signal to be transmitted is supplied to the transmitter circuit 16 by encoding circuits 20, which may be largely software controlled. Control circuits 22 allow users to control operation of the transmitter, and may include keyboards, displays or automatic systems connected, for instance, to fire alarm circuits or the like.

The transmitter 12 can send one of two types of message. These are digitally encoded. The general format of digital packets which form these messages is shown in Fig. 3. Fig. 3 shows a horizontal line divided into sections representing individual bits forming part of the message and sent serially, with the left-hand most bit sent first, followed by bits further to the right in the drawing. The total number of bits in a message, and the manner in which they are used can be chosen according to any desired protocol chosen in accordance with the particular application of the system.

In the message shown in Fig. 3, a first group of bits comprises a "header" 24, followed by a group of message data bits 26.

The contents of the header serve to identify whether the message is of the first or second type. If the message is of the first type, an alarm bit 28 is set (or, alternatively, left unset) to flag this. The remainder of the header is then not of significance. An alarm bit 28 may be accompanied by message data within the group 26 (such as data identifying the nature of an emergency), depending on how the receiver 14 is expected to interpret a message of the first type.

If the message is to be of the second type, the alarm bit 28 is not set (or, in the alternative, is set), but the remainder of the header incorporates appropriate bits to identify a specific receiver which is the intended recipient of the message. In this case, a message will usually be incorporated in the message group 26.

Fig. 4 shows a receiver 14 in more detail. A radio aerial 30 drives receiver circuits in a manner conventional in itself. The output of the receiver circuit 32 is decoded at 34 by means which may be

controlled by hardware, software or a mixture of the two. Having decoded a message, the decoder 34 controls output devices shown in Fig. 4 as a vibrating mechanism 36, and a display 38.

The overall operation of the communication system shown in Fig. 1 can now be described in more detail. Initially in this explanation, it is assumed that all transmitters 12 can send messages of the first or second type, and all receivers can receive both types of message. Other alternatives will be described later.

The transmitter 12A may be located at an appropriate location, such as in a public building 40A. The transmitter 12B is likewise installed, such as in a public building 40B. A deaf or hearing-impaired person (referred to hereafter simply as a "deaf person", for simplicity) will carry one of the receivers 14. Another deaf person can carry another receiver. In principle, it is envisaged that there need be no limit on the number of transmitters or receivers in the system. It is envisaged that at least for first type messages, all transmitters and all receivers will operate on the same frequency, or at least that substantially all receiver means are operable to receive first type messages transmitted by substantially all of the transmitter means.

If a fire alarm arises in one of the buildings, say 40A, the transmitter 12A will transmit a message of the first type, and may do so repeatedly. Any receiver 14 within range of the transmitter 12A, particularly any within the building 40A, will receive that message. The decoder 34 will recognise the message as a message of the first type, by checking the alarm bit 28. Upon detecting a message of the first type, representing an alarm of some form, the decoder 34 will activate the vibrating mechanism 36. This serves to alert the deaf person, who will be unable to hear conventional fire alarms which may also be sounding. The deaf person can then immediately leave the building, or seek assistance.

If the first type message includes message data within the group 26, this can be decoded and displayed at 38. This allows the nature of the alarm to be identified to the user, e.g. as a fire alarm, bomb alert etc., so that appropriate action can be taken.

It is envisaged that by providing a connection between the control circuits 22 of the transmitter 14, and fire alarm and other systems, a first type message can be sent immediately the alarm is activated, so that a deaf person is alerted as quickly as a hearing person.

The presence of the alarm bit 28 in the first type message causes all receivers 14 within range of the transmitter 12A to receive and act on the first type message. Consequently, any deaf person carrying one of the receivers and within range of the transmitter 12A will be alerted, whether or not those in charge of the building are aware of their presence, identity or location. Consequently, in a hotel for instance, it is envisaged that it may be unnecessary to make special arrangements to evacuate a deaf person in the case of a fire, so long as the hotel is equipped with one of the transmitters 12, and the deaf person is equipped with one of the receivers 14. Moreover, since all receivers can preferably receive first type signals from all transmitters, a deaf person will know that their receiver will work in any other building equipped with the system, without them needing to take any special steps or alert those in charge of that building of their presence or identity. It is thus envisaged that the system can greatly enhance the personal safety of a deaf person without necessitating any loss of privacy.

In addition to use in emergencies, as described above, the ability to send second type messages allows the system to be used to send private messages to a specific user. In this case, a transmitter 12 would be

instructed with the identity of the user, and the message to be sent. A message packet would then be made up by the encoder circuits 20. This would include an identifying sequence of bits in the header 24, but no alarm bit 28. The message to be sent would be encoded into the message group 26. When the resultant message is transmitted, all receivers 14 within range will receive it, but all receivers other than the receiver identified by the header will ignore the message upon decoding it and finding that it has neither an alarm bit nor their own identifying data. However, the intended recipient receiver will decode the header 24 to discover that although the alarm bit 28 is not set, the identifying data identifies it. The message in the group 26 can then be decoded and displayed at 38. The user can be alerted to the existence of a message by operation of the vibrating mechanism 36.

The system can be further enhanced, for instance by installing a transmitter 12 at the home or place of work of the deaf person. That transmitter 12 could be connected to fire alarms etc. as described above, and also to door bells, telephones or other equipment. Thus, by carrying a single receiver at all times, a deaf user would be alerted at home to the door bell or telephone ringing, and while out in a public building, would be

alerted to a fire alarm or other emergency.

The principal safety advantages arise from the ability to send messages of the first type from substantially all transmitters to substantially any receiver within range. However, the practical versatility of the system is greatly enhanced by the ability to send messages to specific users. This enhances communiation with a deaf user, but can also be used to enhance communication with a hearing user. A hearing user may carry a receiver 14 which can be used in the same manner to alert them to emergencies, or to receive messages intended for the specific user. It may be that in some cases, hearing users can dispense with the facility to receive first type messages, or that deaf users may dispense with the ability to receive second type messages. However, it is envisaged that in order to be fully effective, all transmitters should normally be expected to transmit at least first type messages, and all receivers to receive them. The ability to send second type messages allows a building to enhance communication with all staff, by the paging nature of the second type messages, while also enhancing the safety of deaf users.

It may be appropriate for each transmitter to send

second type signals on a unique frequency, or encoded in a unique manner. The transmitter would have one or more associated receivers to which it is a "home" transmitter and which are equipped to receive at the unique frequency or decode in the appropriate manner. In that way, the system can provide private paging facilities, e.g. for employees of a business, while still providing emergency assistance for deaf persons, including deaf visitors and deaf employees. A receiver would receive second type messages only from its "home" transmitter but first type messages from any transmitter.

It is realised that on occasions, a receiver might be within range of more than one transmitter and that this might give rise to false alarms, e.g. a first type message received from a neighbouring building. However, it is considered that any inconvenience which results would be acceptable in the light of the advantages accruing from the universality of the system.

It will be apparent that many variations and modifications can be made to the apparatus described above, without departing from the scope of the present invention. In particular, the details of circuits, transmission encoding techniques etc. can be widely varied in accordance with the technology chosen for the

system.

One possible arrangement is for all transmitters to operate on a single frequency but for the header to include a system address identifying the transmitter. Receivers can then ignore second type messages unless received from their "home" transmitter, but can receive a first type message from any transmitter. This arrangement allows a second type message to be sent to the whole group of receivers to which a transmitter is "home", or the header could include additional data specifying one or more of the group.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims :

1. A communication system comprising at least one transmitter means and at least one receiver means, the or each transmitter means being operable to transmit messages for receipt by receiver means, and the or each receiver means being operable to receive messages transmitted by transmitter means, wherein the or at least one of the transmitter means is operable to transmit a message of a first type for receiver means which are not individually identified in the message, or of a second type which includes identification of the intended recipient receiver means.

2. A system according to Claim 1, wherein at least one receiver means is operable to detect identification information contained in a message and to respond to all messages received which are of the first type and to any received message which is of the second type and which identifies that receiver means as the intended recipient.

3. A system according to Claims 1 or 2, comprising at least one receiver means which is operable to detect identification information contained in a message and to respond only to received messages which are of the first type.

4. A system according to Claims 1, 2 or 3, wherein at least one receiver is operable to detect identification information contained in a message and to respond only to a received message which is of the second type and which identifies the receiver means as the intended recipient.

5. A system according to any preceding Claim, wherein substantially all receiver means are operable to receive messages transmitted by substantially any of the transmitter means.

6. A system according to any preceding Claim, wherein the messages are transmitted as radio signals.

7. A system according to any preceding Claim, wherein substantially all of the transmitter means transmit at least first type messages on the same frequency.

8. A system according to any preceding Claim, wherein second type messages are transmitted on respective frequencies by the transmitter means.

9. A system according to any preceding Claim, wherein second type messages are transmitted after encoding in a manner unique to the transmitter means in use.

10. A system according to Claim 9, wherein receiver means are operable to decode second type messages only if sent from designated transmitter means with which they are associated.

11. A system according to any preceding Claim, wherein substantially all transmitters are operable to transmit messages of the first type, whereby receiver means may be sent a message of the first type when within range of substantially any transmitter.

12. A system according to any preceding Claim, wherein substantially all of the transmitters are operable to transmit messages of the first and of the second type.

13. A system according to any preceding Claim, wherein messages are digitally encoded.

14. A system according to Claim 13, wherein messages include label data which identifies the intended recipient receiver means or identifies the message as a message of the first type.

15. A system according to Claim 14, wherein a message of the first type includes identification of the message as a message of the first type.

16. A system according to Claim 14 or 15, wherein a message of the first type may be identified by the state of an identifying bit.

17. A system according to any preceding Claim, wherein at least messages of the second type may include message data.

18. A system according to any preceding Claim, wherein at least one receiver means is operable in receipt of a first message to alert a user in a substantially non-audible manner.

19. A system according to Claim 18, wherein the said one receiver means is operable to vibrate to alert a user.

20. Transmitter means for use in the system according to any preceding Claim, and operable to send first type and second type signals.

21. Receiver means for use in the system defined in any of Claims 1 to 19, and operable to receive first type or second type signals.

22. A communication system substantially as described above, with reference to the accompanying drawings.

23. Any novel subject matter or combination including novel subject matter disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.

The Patent Office

18

Application No: GB 9610577.0 **Examiner:** Mr Jared Stokes
Claims searched: 1 to 22 **Date of search:** 26 July 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4H (NEL, NMB)
H4L (LDA, LDLX, LERA, LETD)

Int Cl (Ed.6): G08B (3/10)
H04M (11/00, 11/02, 11/04, 11/08)
H04Q (7/06, 7/08, 7/16)

Other: On-line: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X, Y	GB 2 198 269 A	(Multitone) Whole document, especially page 3 lines 12-17	X: 1, 2, 5, 6, 12-15, 17, 18, 20 ,21 Y: 19
Y	GB 2 135 156 A	(Hughes) Whole Document	19
X	WO 90/03041 A1	(Motorola) Page 6 line 18-page 8 line 6	1, 2, 6, 8, 12-15, 17, 20, 21

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.